

Chapter 3: Lake Okeechobee Annual Report

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OVERVIEW OF LAKE OKEECHOBEE PROTECTION PROGRAM

The Lake Okeechobee Protection Act (LOPA) [Section 373.4595, Florida Statutes (F.S.)] was passed by the 2000 Florida Legislature. This program committed the state of Florida to restore and protect Lake Okeechobee. This will be accomplished by achieving and maintaining compliance with water quality standards in Lake Okeechobee and its tributary waters through a watershed-based, phased, comprehensive, and innovative protection program designed to reduce phosphorus (P) loads and implement long-term solutions based upon the lake's total maximum daily load (TMDL). The program sets forth a series of activities and deliverables for the coordinating agencies: the South Florida Water Management District (District or SFWMD), the Florida Department of Environmental Protection (FDEP), and the Florida Department of Agriculture and Consumer Services (FDACS). This is the fifth annual report to the Legislature summarizing the water quality and habitat conditions of the lake and its watershed, implementation activities of the past year including the status of the Lake Okeechobee Construction Project, challenges and unresolved issues. A companion report, the Lake Okeechobee Protection Plan (LOPP), identifies areas requiring future legislative support to successfully implement the state's commitment to protect and restore this resource.

DESCRIPTION OF LAKE OKEECHOBEE AND THE WATERSHED

LAKE OKEECHOBEE

Lake Okeechobee is a large, shallow, eutrophic lake located in south Central Florida. The lake is the largest body of fresh water in the Southeastern United States and covers a surface area of 730 square miles, with an average depth of 8.6 feet. It is encircled by an embankment that is approximately 140 miles long with crest elevations ranging from 32 to 46 feet National Geodetic Vertical Datum (NGVD) (URS Group, 2002). Lake Okeechobee functions as the central part of a large interconnected aquatic ecosystem in South Florida and as the major surface water body of the Central and Southern Florida Flood Control Project (C&SF Project). The lake provides a number of values to society and nature including water supply for agriculture, urban areas, and the environment; flood protection; a multimillion-dollar sport and commercial fishery; and habitat for wading birds, migratory waterfowl, and the federally endangered Everglades Snail Kite. These values of the lake have been threatened in recent decades by excessive phosphorus (P) loading, harmful high and low water levels, and rapid expansion of exotic plants.

SPECIFIC ISSUES OF CONCERN

Water Quantity

- To address high lake stages, the District received a temporary deviation in December 2003 from the U.S. Army Corps of Engineers (USACE), to allow low-level releases from the lake when not specifically required. As a result of the temporary deviation and below-normal rainfall, water levels in the lake declined from above 15 feet in winter to near 12 feet in early summer 2004.
- The low-level pulse releases were accomplished without any significant environmental impacts to the estuaries.
- Extreme high inflows, due to three hurricanes, raised the stage to over 18 feet by October and required large releases to the estuaries.

Ecological Attributes

- The lower water levels have resulted in widespread growth of submerged aquatic vegetation in the lake's shoreline areas (**Figure 3-1**), as well as development of dense stands of shoreline emergent plants.
- In the shoreline areas with dense beds of plants, water transparency has been very high.
- Fish are actively nesting in the recovered shoreline areas and the overall effects of low water on the lake's fishery are expected to be very positive.
- In summary, the lake has substantially recovered from the impacts of high water that occurred in 2002 and 2003 as a result of this period of low stage in 2004.



Lake Okeechobee Division

Submerged Vegetation Map For Lake Okeechobee August 2004

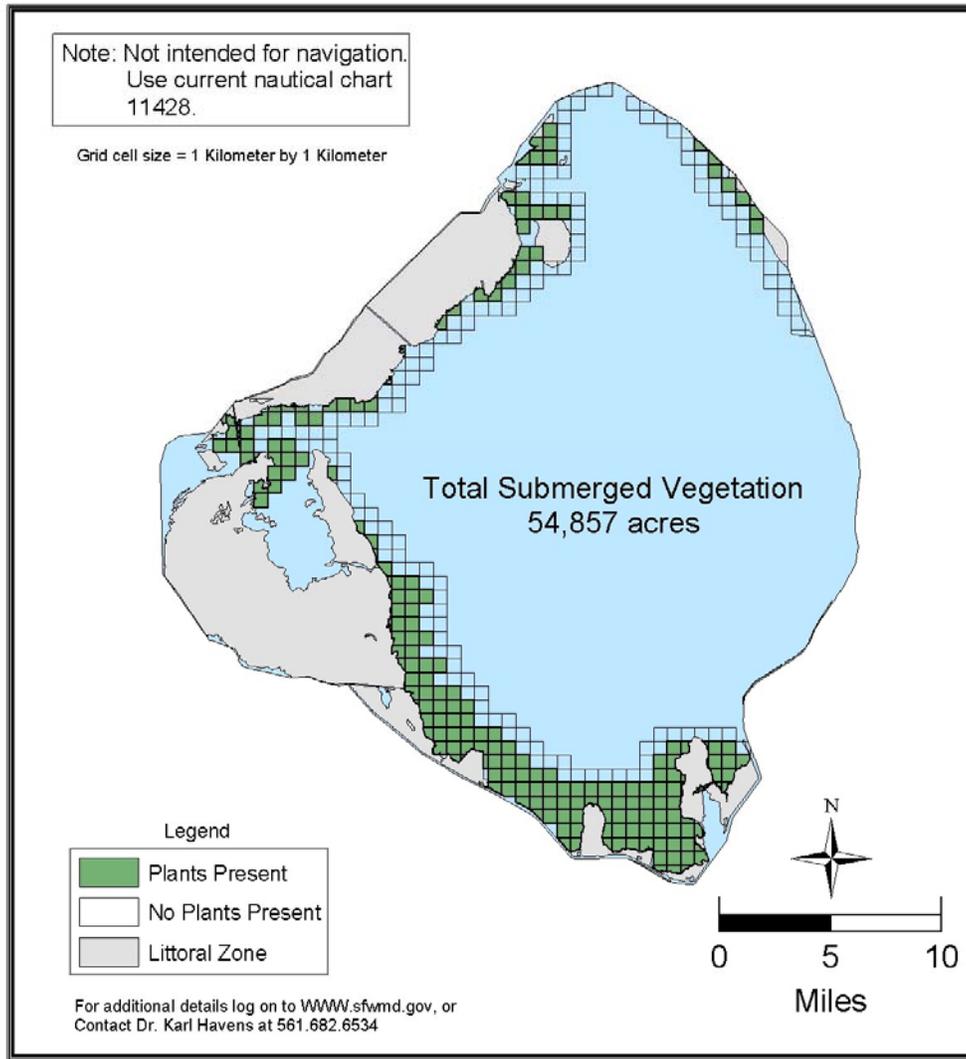


Figure 3-1. Submerged vegetation map for Lake Okeechobee (August 2004).

Water Quality

- Total phosphorus concentrations in the lake have more than doubled since the early 1970s, now averaging more than 112 parts per billion (ppb).
- There is a high rate of phosphorus loading to the lake from both the watershed (external loads) and from the mud sediments within the lake (internal loads).
- During Water Year 2004 (WY2004) (May 1, 2003 through April 30, 2004), the annual load to Lake Okeechobee was 549 metric tons. The five-year average phosphorus load from WY2000 to WY2004 was 528 metric tons and exceeded the Lake Okeechobee TMDL by 388 metric tons (**Table 3-1**). This five-year average also includes the smallest measured historical load in the past 12 years (141 metric tons in 2001) due to the worst drought in recent history. This extreme annual load documents the reason that the TMDL is based on a five-year average, to account for variations in water flow and loads.

Table 3-1. Total phosphorus loads (in metric tons) to Lake Okeechobee from 1993–2004.

Water Year (May 1– April 30)	Measured Load ^a	Long-Term Load (five-year moving average) ^a	Long-Term Over-target Load (five-year moving average) ^{ab}
1993	518	384	244
1994	185	376	236
1995	621	427	287
1996	647	476	336
1997	172	428	288
1998	920	509	369
1999	315	535	395
2000	689	548	408
2001	141	447	307
2002	621	537	397
2003	642	482	342
2004	549	528	388

^a Measured Loads include an atmospheric load of 35 metric tons per year based on the Lake Okeechobee TMDL (FDEP, 2001).

^b Target load is the Lake Okeechobee TMDL of 140 metric tons (FDEP, 2001) compared to a five-year moving average.

ONGOING PROJECTS REQUIRED BY THE LAKE OKEECHOBEE PROTECTION PROGRAM

WATERSHED PHOSPHORUS CONTROL PROGRAMS

Agricultural Programs

FDACS Lake Okeechobee Watershed Agricultural Best Management Practice Phosphorus Control Program

A considerable effort has been expended in 2002 and 2003 on the implementation of agricultural Best Management Practices (BMPs) to immediately impact the watershed's phosphorus discharges to the lake.

The coordinating agencies agreed that the first step to successfully control phosphorus is to develop a tool to determine specific on-farm current and future phosphorus sources. The development of this tool, called an Agricultural Nutrient Management Assessment (AgNMA) was completed in 2002. AgNMAs were completed for all active dairies in the four priority basins of the Lake Okeechobee Watershed (S-191, S-154, S-65D, and S-65E), representing over 31,000 acres (**Figure 3-2**). An additional 6,700 acres of former dairies also have had nutrient management assessments completed. Once the specific on-farm current and future phosphorus sources were identified, Agriculture Nutrient Management Plans (AgNMPs) were completed for each dairy. The two goals of the AgNMPs were whole-farm nutrient balance and an edge-of-farm phosphorus discharge concentration of 150 ppb. Each dairy shared common phosphorus sources, but each also had unique circumstances. The AgNMPs indicated that it would cost a total of \$105 million to achieve both of these goals for all dairies in the watershed.

The FDACS and the Natural Resources Conservation Service (NRCS) have executed an interagency Memorandum of Agreement (MOA) that commits the available resources within the two agencies to hasten delivery and implementation of nutrient and conservation management planning to agricultural landowners in the watershed. To accelerate the development of conservation plans in another effort, the FDACS has contracted with the University of Florida – Institute of Food and Agricultural Sciences (UF-IFAS) to provide training for third-party vendors who wish to participate in the development of nutrient management and/or conservation plans.

Conservation plans have been completed on 27,476 acres, with an additional 61,391 acres in the planning process. Cow/calf production is the largest agricultural land use in the Lake Okeechobee Watershed, and it is anticipated that the implementation of BMPs identified by conservation plans will substantially improve water quality in the watershed. In a cooperative effort, the FDACS and the NRCS have obtained a federal appropriation of \$500,000 to further advance conservation planning in the Lake Okeechobee Watershed. These funds have been used to identify and train technical service providers and conservation planners who are willing to work in the Lake Okeechobee Watershed to develop conservation plans for cow/calf operations. The FDACS has contracted with Environmental Management Solutions (EMS), a certified technical service provider, for services related to the expedited conservation planning effort. This creative endeavor has resulted in an additional 94,907 acres of conservation plans under development in the four priority basins, with another 46,033 acres waiting planning. Collectively, the nutrient management assessment and conservation planning activities cover 267,507 acres, or 94 percent of the agricultural acreage in the four priority basins (**Figure 3-2**). An additional 84,200 acres of

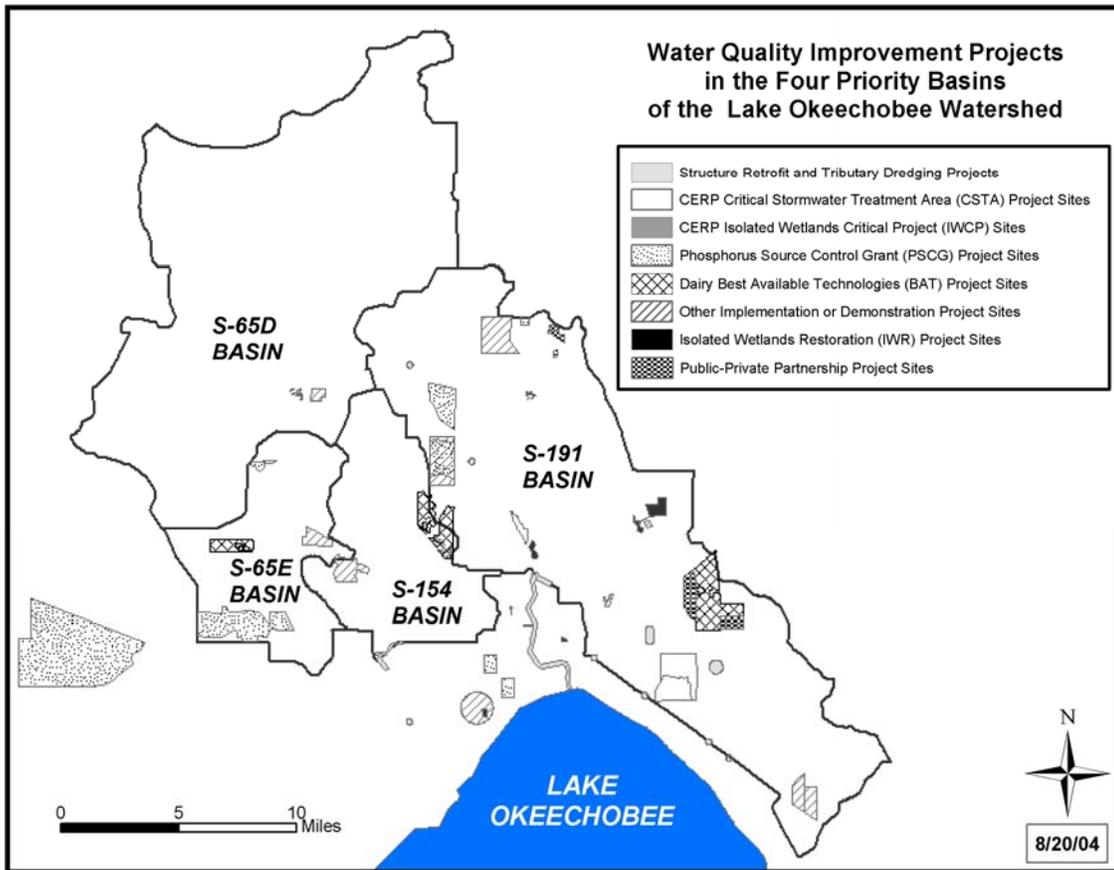


Figure 3-2. Area of landowner participation in the four priority basins of the Lake Okeechobee watershed.

agriculture operations outside the four priority basins also have agreed to participate in the process.

In addition to leveraging state and federal dollars for planning and cost-share programs, the FDACS and the NRCS have worked cooperatively with other partners to prepare a Public Law 566 (P.L.-566) Small Watershed proposal through the NRCS that has been submitted for consideration by Congress. The P.L.-566 proposal, if approved, would greatly increase the amount of federal funding available for BMP planning, implementation, and cost-share in the lower Kissimmee and S-191 (Taylor Creek/Nubbin Slough) basins. If accepted, these activities would begin in 2005.

The FDACS has adopted an administrative rule (5M-3) that adopts BMP manuals for citrus producers and cow/calf operations and AgNMA's for dairy operations, and discusses the process for implementing these BMPs in Okeechobee County. The FDACS is in the process of adopting this rule watershed-wide. It is also developing a non-regulatory, incentive-based BMP implementation program for other agricultural activities including vegetables and row crops, modeled after the Indian River Lagoon Citrus BMP Program. Through this rule, the implementation of a FDACS farm assessment, Notice of Intent to implement a BMP plan, or a NRCS plan will provide the landowner with a presumption of compliance with the state water quality criteria. Landowners who choose not to participate in the FDACS BMP programs will be required to monitor the quality and quantity of water leaving their properties to demonstrate compliance with existing and future phosphorus targets and requirements through the Works of the District (WOD) permitting program.

Best Available Technologies

In October 2000, the District initiated the Dairy Best Available Technologies project to identify, select, and implement Best Available Technologies (BATs) to significantly reduce phosphorus loading from dairy operations in the Lake Okeechobee Watershed. After a thorough evaluation of alternatives by an interagency project team, edge-of-farm stormwater treatment was selected for implementation on three dairy properties in the Lake Okeechobee Watershed (**Figure 3-3**). These projects consist of capturing stormwater runoff (especially from all of the high-nutrient pasture areas); reusing the runoff onsite in current operations if possible; and if offsite discharge is necessary, chemically treating the storm water prior to its release. The three Dairy BATs projects are fully constructed, and performance monitoring was initiated in May 2004. Phosphorus load monitoring is a component of the project so that performance can be accurately determined. Project performance is being evaluated at various total phosphorus discharge concentration goals, ranging from 150 ppb to 40 ppb. Annual phosphorus load reductions could range from 80 percent to 90 percent.

The FDEP provided funds from the 2002–2003 state general revenue funds designated for TMDL implementation projects to be used for the design and implementation of a fourth dairy BAT site. The coordinating agencies are currently developing the design of the next site, which is scheduled for construction in February 2005.

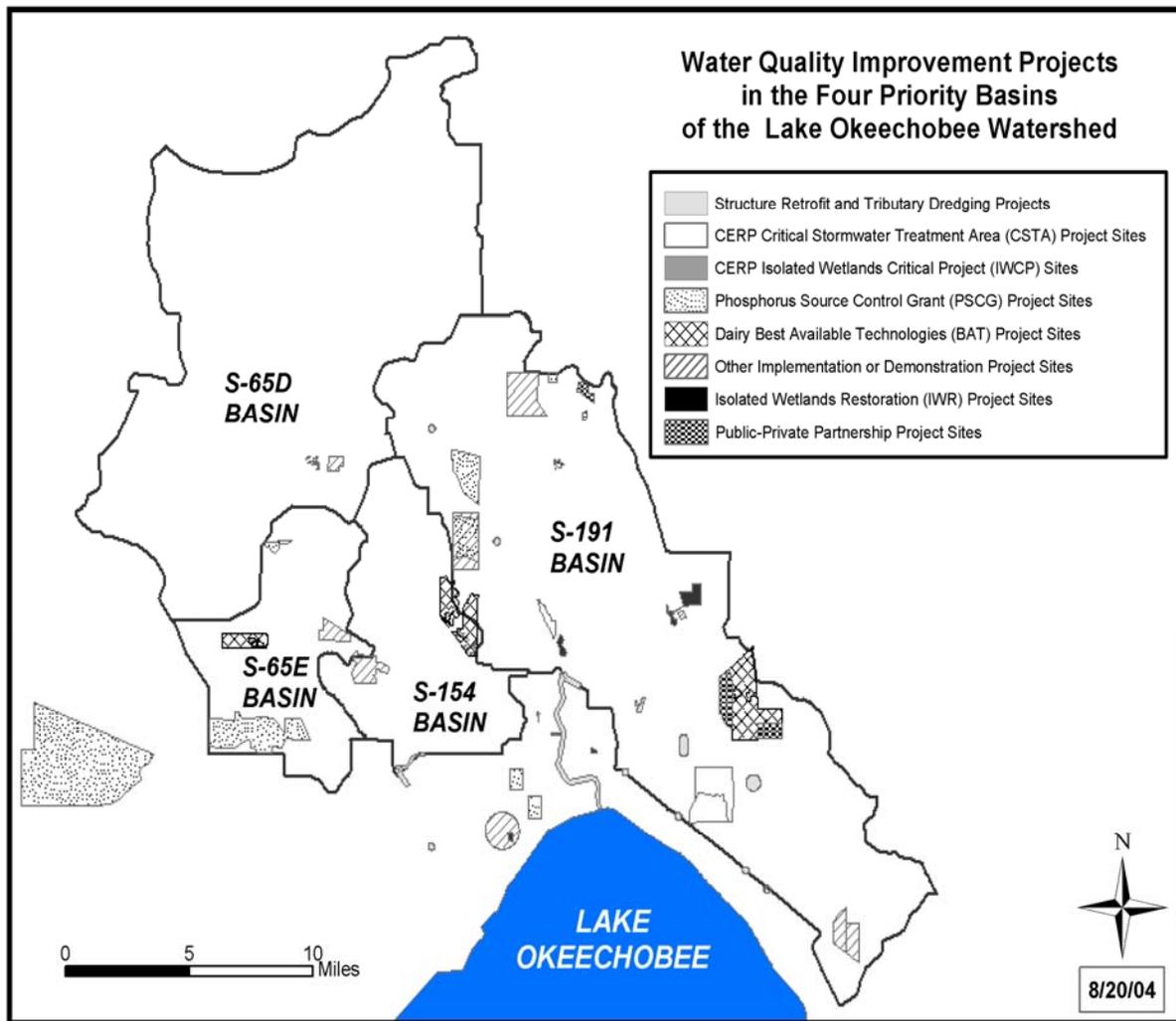


Figure 3-3. Water quality improvement projects in the four priority basins of the Lake Okeechobee Watershed.

Isolated Wetlands

The Lake Okeechobee Isolated Wetland Restoration Program (LOIWRP) is designed to restore the amount and timing of stormwater runoff to a wetland, which will reduce the amount of phosphorus discharged from parcels to Lake Okeechobee. Historically, isolated wetlands covered a significant percent of land area in the four priority basins, capturing stormwater runoff and helping to retain phosphorus in the watershed. However, many of these wetlands have been drained to increase the amount of land in agricultural production, allowing more phosphorus to reach Lake Okeechobee. The LOIWRP is designed to reduce phosphorus discharge from land parcels to Lake Okeechobee through wetland restoration.

As a cost-share program, the LOIWRP pays for all wetland restoration costs, including land survey, design, permits, construction, initial exotic and nuisance plant removal, fencing and monitoring; plus the value of the easement. The landowner will be responsible for paying property taxes and for the operation and maintenance of the restored area. Landowners have the choice of entering into a 30-year or perpetual easement agreement for the portion of their property that is enrolled in the program. The District is administering the LOIWRP with the cooperation of a multi-agency team that includes the FDACS, FDEP, NRCS, United States Fish and Wildlife Service (USFWS), and UF-IFAS. The program currently has a total of four projects: one was completed in March 2004 (Kirton Ranch), two are state-owned properties in the design phase (Lemkin Creek and Eckerd Youth Center), and one is private-owned land in the planning stage (Hazellief Ranch) (**Figure 3-3**).

There are currently about 44,902 acres of restorable wetlands in the four priority basins. The LOIWRP estimates that approximately 605 acres of wetlands will be restored through this program with a drainage/treatment area of 1,153 acres, notably reducing phosphorus loads to Lake Okeechobee. The phosphorus load reduction for the one completed project which restored 410 acres of wetlands is estimated to be 1.2 metric tons per year (a 71 percent reduction).

Several other wetland restoration or enhancement programs outside the LOIWRP are available for landowner participation. University of Florida staff is leading an interagency team that has developed a Wetland Enhancement Program which assists landowners in selecting a wetland program that best fits the landowner's operations. The program is funded through the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service's Competitive Grants in the National Integrated Water Quality Program, and puts together a comprehensive list of all programs available for wetland restoration in the Lake Okeechobee Watershed. Landowners will be more fully educated on their options, and therefore participation in the various programs should increase, resulting in more restored wetlands and improved water quality.

Former Dairy Remediation

In 1989, the Dairy Buy-Out Program was established upon request by the dairy industry for farmers who were unwilling or unable to comply with the FDEP Dairy Rule by implementing BMPs as mandated. The Dairy Buy-Out Program did not purchase the property or cows but simply facilitated removal of the animals. Of the 49 original dairies that existed in the Lower Kissimmee River and the S-191 (Taylor Creek/Nubbin Slough) basins before implementation of the Dairy Rule, 18 participated in the Dairy Buy-Out Program. A total of 14,039 milking cows were relocated under this program or were removed from the watershed for other reasons. These former dairies have a high amount of residual phosphorus in the soil.

Many of the former dairies are now privately owned cow/calf operations and are currently discharging water that is non-compliant with the Works of the District program [i.e., they are discharging above the Surface Water Improvement and Management (SWIM) limit].

The former Lamb Island Dairy, owned by the District, is currently undergoing remediation under the Lamb Island Dairy Remediation Project. Lagoon remediation, stormwater runoff detention/retention, and wetland enhancement are the primary activities being implemented. Remediation projects are also in various stages of implementation for five privately owned former dairies that are now cow/calf operations. The goal of the remediation is to implement practices and technologies that will reduce the phosphorus surface water discharge to 150 ppb or less from the former dairies, based on information presented in the AgNMA. An interagency team is participating in the design, implementation, and evaluation of the restoration projects. The currently planned remediation practices include retaining runoff from old high intensity areas (HIAs), rehydrating onsite wetlands, amending high phosphorus soils, and reducing the flow of storm water offsite.

Regulatory

Works of the District Permitting

See Watershed Management, Works of the District/Lake Okeechobee Watershed Assessment (LOWA) in Chapter 10 of the *2005 South Florida Environmental Report – Volume I*.

Dairy Rule/National Pollutant Discharge Elimination System Permitting

The FDEP regulates the dairy farms and other confined animal operations located in the Lake Okeechobee Watershed under State Law, Chapter 62-670.500, F.A.C. (Dairy Rule). The purpose of the rule is to control pollution of waters of the state due to the discharge of wastewater and runoff from dairies and other confined animal operations in the Lake Okeechobee Watershed to surface and groundwater. The system of practices specified in Chapter 62-670.500(5) through (8), F.A.C., for the collection and recycling of wastewater by proper land disposal, together with the associated management practices, is established for the purpose of determining compliance with water quality standards. Implementation of these practices will be presumed to provide reasonable assurance that the facility will meet water quality standards in waters of the state.

Additionally, the U.S. Environmental Protection Agency (USEPA) reinterpreted their federal rules regarding National Pollution Discharge Elimination System (NPDES) permitting of Concentrated Animal Feeding Operations (CAFOs). The state must implement these federal rules by December 2004. Based on USEPA rules, it has been determined that all of the dairies and some of the other CAFOs (horses, hogs and chickens) located within the Lake Okeechobee Watershed must obtain NPDES permits. The permitting requirements include the development and implementation of a nutrient management plan, record keeping, transfer of waste to third parties, and annual reporting. As current state permits expire, the FDEP will be issuing new generic permits that meet the permitting requirements of both the state and the NPDES.

Evaluation of Land Use Changes

The LOPA requires that “Prior to authorizing a discharge into works of the District, the District shall require responsible parties to demonstrate that proposed changes in land use will not result in increased phosphorus loading over that of existing land uses.” To meet this requirement, the District is developing a two-tiered approach to help landowners assess the impact of land use

changes on phosphorus loads leaving a land parcel. The first-tier approach is the computation of net phosphorus imports from phosphorus budgets for both the current and proposed land uses. If the net import for a proposed land use is less than or equal to the net import for an existing land use without increasing annual runoff volumes, the no increase in phosphorus load requirement is considered to have been met. The methodology is easy to use, and can be implemented in a short period of time. If the first-tier approach does not meet the phosphorus load requirements, the second-tier approach requires the use of a computer model to simulate phosphorus loads. Again, if the simulated load for a proposed land use is less than or equal to the simulated load for an existing land use, the LOPA phosphorus requirement is considered to be met. This approach is developed to estimate phosphorus loads using a more rigorous approach than computing net phosphorus imports.

Non-Agricultural Programs

Lake Okeechobee Watershed Non-Agricultural Best Management Practice Phosphorus Control Program

A phased approach is utilized to reduce phosphorus loadings to Lake Okeechobee from non-agricultural areas in the Lake Okeechobee Watershed. The largest contributors of phosphorus loading from non-agricultural areas to Lake Okeechobee are animal feed and fertilizer distributors, golf courses, and failing wastewater systems (septic tanks and package plants). Efforts since the inception of the LOPA include implementation of interim measures (BMPs), master planning for storm water and wastewater, implementation of stormwater retrofits, designs for larger urban stormwater projects, and public education.

The first phase was to implement interim measures. The interim BMPs include those identified in the Florida Land Development Manual, UF-IFAS lawn fertilization rates, and UF-IFAS turfgrass BMPs. These nonstructural BMPs primarily target homeowners and businesses. UF-IFAS extension agents are working with homeowners as well as lawn maintenance companies on better lawn management. The implementation of these BMPs follows a non-regulatory incentive-based approach.

The next phase is to develop more detailed plans for addressing phosphorus loading to Lake Okeechobee from storm water and wastewater within the urbanized areas in the watershed. There are currently no central urbanized areas within the four priority basins, so the focus of the non-agricultural program has been outside the four priority basins in those urban areas that border Lake Okeechobee. Stormwater master plans have been developed for two of the urban areas surrounding Lake Okeechobee — the City of Okeechobee/Okeechobee County and the City of Moore Haven/Glades County. Stormwater master plans will also need to be developed for the remaining urban areas within the Lake Okeechobee Watershed, and will be essential for addressing the stormwater issues in these areas. Because a majority of the urban areas were developed prior to the development of state stormwater regulations, the existing infrastructure is typically inadequate to properly deal with storm water. Stormwater retrofits, such as detention/retention facilities and swales, are needed to improve the water quality of the urban stormwater runoff. The FDEP is sharing the cost with the City of Okeechobee to improve the water quality of urban stormwater runoff by installing a baffle box and regrading swales in a residential area near the 4th Street Boat Ramp. The FDEP and the SFWMD are also working together to fund the implementation of two additional baffle boxes.

Wastewater master plans are being completed for these areas to address the need for upgrading failing septic tanks and package wastewater treatment plants through connection to the

central sewer system which was completed in January 2004. A part of each plan will address the need to expand the capacity of the central wastewater treatment plant (the Okeechobee Utility Authority) to accept the additional wastewater from those areas that are currently utilizing failing septic tanks and package wastewater treatment plants.

Public education is an essential component for reducing phosphorus entering storm water in the urbanized areas. The UF-IFAS, through the Florida Yards and Neighborhoods Program, provides weekly newspaper articles in the Okeechobee newspapers that address proper lawn maintenance practices. Additionally, a brochure has been developed in conjunction with the fertilizer industry to promote the use of low- or no-phosphorus fertilizers and the use of appropriate BMPs when utilizing such chemicals. This brochure is available at retail stores where fertilizers are sold.

Phosphorus Source Control Grants

The intent of the Lake Okeechobee Phosphorus Source Control Grant (PSCG) program is to fund the early implementation of projects that have the potential for reducing phosphorus exports to Lake Okeechobee from the watershed. Currently, the program consists of 13 projects (**Figure 3-3**), with a total cost of slightly more than \$7 million. The FDEP provided funds from the 2002–2003 state general revenue designated for TMDL implementation projects to add the last grant project. An interagency team evaluated the projects and ranked them using established evaluation criteria. The funded projects range in size and complexity and grant recipients consist of landowners, public facilities, and private corporations.

All PSCG projects have a target implementation date of September 30, 2004 with an operational life of 10 years or more. As of August 2004, the status of the 13 projects breaks down as follows: two projects are in the planning/permitting stage, two are under construction, five are operational and being monitored, and four have been completed. Forecasts for the remainder of calendar year 2004 are two projects will move from the planning to the construction stage, two will move from the construction to the operation/monitoring stage, and one will move from the operation/monitoring stage to completed status.

Of the 13 PSCG projects, 11 are agricultural, and include isolated wetland restoration, stormwater retention areas, chemical treatment of runoff, concrete cooling ponds for dairy cows, and composting of chicken manure.

There are two urban PSCG projects: a fertilizer pelletization plant for wastewater treatment residuals from the central East Coast of Florida, and replacement of septic systems and package wastewater treatment systems with a gravity sewer system in Okeechobee.

Regulatory

Domestic Wastewater Regulations

Generally, the FDEP requires that entities who intend to collect/transmit, treat, dispose of, and/or reuse domestic wastewater obtain a state and/or federal NPDES wastewater permit. A domestic wastewater permit specifies the construction and operating requirements for the wastewater treatment plant and the associated reuse or disposal systems (effluent, reclaimed water, and residuals). The USEPA has delegated the authority to issue NPDES permits for domestic wastewater facilities not owned by the federal government to the FDEP. Currently, of

the 251 domestic wastewater facilities within the Lake Okeechobee Watershed only seven are classified as NPDES facilities.

The discharge of wastewater to surface waters cannot cause or contribute to water quality problems and must be in compliance with any applicable TMDLs for that associated water body. Additional information can be found on the FDEP's Website at <http://www.dep.state.fl.us/water/wastewater/index.htm>.

Another component of the domestic wastewater stream, which is regulated under the LOPA, is the management of residuals (bio-solids) from a wastewater treatment plant. Section 373.4595(3)(6)(a), F.S., requires all entities disposing of domestic wastewater residuals within the Lake Okeechobee Watershed and the remaining areas of Okeechobee, Glades, and Hendry counties to apply the material at agronomic rates based on phosphorus. By July 1, 2005, phosphorus concentrations originating from these application sites shall not exceed the limits established in the WOD program. This requirement has reduced the quantity of material that historically had been land applied in the watershed. Typically, less material can be applied to a site when it is applied at agronomic rates based on phosphorus as compared to nitrogen. As a result of this, several land application sites were chosen to discontinue land-applying bio-solids. Currently, there are three sites north of Lake Okeechobee and 15 sites south of the lake that have been approved to receive residuals. The application of liquid or solid material pumped from septic tanks and similar domestic sewage treatment systems, also referred to as septage, is also subject to the same requirements, according to Section 373.4595(3)(7), F.S. The Florida Department of Health permits the application of septage, and is responsible for ensuring that the application at these sites is according to phosphorus-based agronomic rates. Currently, there are two sites north of the lake that are approved to receive septage.

Municipal Separate Storm Sewer System Regulations

NPDES permits are required for many Municipal Separate Storm Sewer Systems (MS4s), which are publicly owned conveyances designed for the discharge of storm water to surface waters of the state. A NPDES permit is required to protect water quality of surface waters currently receiving discharges from MS4s. As part of a permit, operators of a regulated MS4 must develop a stormwater management program that includes public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction-site runoff control, post-construction runoff control, pollution prevention/good housekeeping, and regular reporting. Regulated MS4s are brought under regulation through three mechanisms: automatic designation based on population size, designation by FDEP, and public petition for designation by FDEP. The FDEP recently revised its rules to include the designation criteria for small MS4s. One designation criterion for regulation will include any MS4 that discharges to a water body with a designated TMDL. Additional information is available on the FDEP's Website at <http://www.dep.state.fl.us/water/stormwater/npdes>. These designation criteria will require all urban areas discharging into Lake Okeechobee to be regulated under the NPDES program. At this time, the date by which these urban areas must be covered under permit has not yet been identified. However, consultants have already worked with the City of Okeechobee/Okeechobee County to complete an NPDES permit application.

Regional Projects/Public-Private Partnerships

The Lake Okeechobee Regional Public-Private Partnership Program solicitation was released on November 15, 2002 and seven proposals were received by the submission deadline. An interagency selection committee comprised of representatives from the FDEP, the FDACS, and

the District evaluated the seven proposals based on evaluation criteria identified in the program guidelines.

The Governing Board authorized entering into negotiations and subsequent contracts with the two top-ranked respondents (Green-Cycle/QED and Davie Dairy) to not exceed a total of \$4.75 million. The Green-Cycle (Lake Okeechobee) Inc./QED Environmental Solutions (Florida) LLC project consists of constructing solid separators and wastewater treatment plants at three dairy barns and a fertilizer complex to produce an organic fertilizer from the dairy and Tampa Farm Service chicken manure solids. The fertilizer and/or organic soil amendment would be exported from the Lake Okeechobee Watershed. The project estimates that 33 metric tons of phosphorus in runoff to the lake per year would be stopped if the dairies and chicken farms exported their waste in this manner. Green-Cycle will receive \$4.2 million from this program. The proposal also contained an estimate that the private contribution to the project would cost over \$42 million, and that it will generate up to 50 new jobs. Green-Cycle/QED signed a contract with the SFWMD in October 2003, and has an option on property in Highlands County, adjacent to the landfill. Davie Dairy signed a contract with the SFWMD in April 2004.

The second-ranked respondent, Davie Dairy, is a participant in the District's Dairy BATs project (see the Best Available Technologies section of this chapter) and has completed construction of an edge-of-farm detention area with chemical treatment of farm runoff under that program. Through the Public-Private Partnership Program, the dairy is proposing to treat an additional 800 acres of offsite runoff through their treatment system, which will provide 0.45 metric tons of phosphorus reduction on an annual basis. Davie Dairy will receive \$550,000 to conduct the project. Private contributions were estimated at 24 percent of the total project cost.

According to Green-Cycle/QED project schedule estimates, the dairy wastewater treatment plants could be constructed by early next year, with fertilizer plant construction initiated by the end of 2004. Davie Dairy is currently treating the offsite runoff. Both projects are estimated to have a 20-year life, which coincides with the term of the District's contracts.

Another regional project is the expansion of the Nubbin Slough Critical Stormwater Treatment Area (STA), as described in the Lake Okeechobee Water Retention/Phosphorus Removal Critical Project section of this chapter. Runoff from Taylor Creek's watershed will be routed into an additional 1,200 acres surrounding the critical STA footprint. The expansion project is currently under design.

Research and Studies/Effectiveness

Best Management Practices

According to the LOPA, a two-phased approach will be used to determine the effectiveness of BMPs. The first phase requires that the FDEP use best professional judgment in making the initial determination of BMP effectiveness. An interagency team worked with outside experts in the field on developing the initial BMP performance estimates for all land uses. This level of verification provided the necessary confidence to the coordinating agencies to immediately move forward in implementing BMPs, even if extensive data on their effectiveness was not available. Implementation of BMPs from adopted and approved BMP manuals based on an FDACS farm assessment or a site-specific plan developed through the NRCS would qualify for this phase.

The second phase involves the District or FDEP conducting water quality monitoring at representative sites to verify the effectiveness of BMPs. Monitoring during this phase will be conducted at a basin and sub-basin scale by the District through the Works of the District

program, and at the parcel level through UF-IFAS research demonstration projects designed to verify the effectiveness of a typical suite of BMPs. The data generated from these studies will provide model input (i.e., the Everglades Agricultural Area Model) to support information already being used by the coordinating agencies to assess overall BMP performance for the watershed. Current projects include the following:

- Demonstration of Water Quality Best Management Practices for Beef Cattle Ranching in the Lake Okeechobee Basin (a UF-IFAS project).
- Phosphorus Retention and Storage by Isolated and Constructed Wetlands in the Okeechobee Drainage Basin (a UF-IFAS project).
- Crop Phytoremediation of Phosphorus-Enriched Soils in the Lake Okeechobee Region (a UF-IFAS project).
- Cattle BMP Optimization at Buck Island Ranch (an Archbold Expedition project).

This basin and sub-basin monitoring will be conducted through the Lake Okeechobee Watershed Project (LOWP) of CERP and through the District's ambient water quality monitoring program. Through the LOWP, the United States Geological Survey will be monitoring 17 sub-basin sites within the LOWP boundary (**Figure 3-4**) north of Lake Okeechobee. Additional information can be found on the Comprehensive Everglades Restoration Plan (CERP) Website at http://www.evergladesplan.org/pm/projects/proj_01_lake_o_watershed.cfm.

In addition, the District has restructured the WOD farm level monitoring network to a micro-basin level monitoring network for 10 basins discharging into Lake Okeechobee from the watershed. These basin, sub-basin, and micro-basin sampling sites will be used to monitor changes in water quality (P loads and concentrations). If changes are observed, the District has the ability to do more intensive monitoring within the basin to identify the sources of phosphorus. If high phosphorus source areas are detected, the coordinating agencies can require the implementation of additional BMPs.

Project Effectiveness

Implementation and demonstration projects funded under the LOPA include phosphorus load monitoring to determine the ability of projects or practices to reduce phosphorus loads to Lake Okeechobee. This information will be utilized in determining the appropriate management strategies needed to achieve the overall desired phosphorus load reductions.

Program Effectiveness

The overall effectiveness of the Lake Okeechobee Program will be determined through the monitoring of phosphorus loads entering Lake Okeechobee. The total cumulative phosphorus loading from the watershed allowed by the TMDL is 105 metric tons per year. The data utilized in this determination is collected by the District at the structures entering Lake Okeechobee.

Other Research Projects

For information on other research projects related to the Lake Okeechobee Protection Program, see the Watershed Status, Management, and Research and the Lake Status, Management, and Research sections in Chapter 10 of the *2005 South Florida Environmental Report – Volume I*.

EXOTIC SPECIES CONTROL PROGRAM

The objective of the LOPA Exotic Species Control Program is to identify the species (both exotic and nuisance) that threaten the native flora and fauna within the Lake Okeechobee Watershed and develop and implement measures to protect native species. In June 2002, the mandated LOPA Exotic Species Plan was completed, and can be found at http://www.sfwmd.gov/org/wrp/wrp_okee/projects/exotic_species.pdf. The goal of the exotic species program is to reach maintenance control on the priority species listed in the plan, as well as other species which may become invasive in the future. More information on exotic species control can be found in Chapter 9 of the *2005 South Florida Environmental Report – Volume I*.

The in-lake treatment targets are as follows:

1. **Reduce torpedograss (*Panicum repens*) populations in the littoral zone in Lake Okeechobee.** Since 2000, more than 16,000 acres of torpedograss have been treated in Lake Okeechobee's marsh. Nearly 13,000 acres, and 3,500 acres of torpedograss, were treated in the southwest and northwest marsh, respectively. Most treatments occurred in areas where torpedograss was threatening or had already invaded native spikerush and shallow open water habitat. Developing a selective treatment method that can be used to control only torpedograss in areas that also contain desirable native vegetation remains a high priority.
2. **Eradicate melaleuca (*Melaleuca quinquenervia*) from the littoral zone in Lake Okeechobee.** All existing mature melaleuca trees have been treated. Additional management activities (Phase II) were initiated, including removing and/or treating seedlings and other young melaleuca trees before they mature and produce seed. In 2003, young melaleuca seedlings and saplings were removed from a 1,000-acre area.
3. **Reduce Brazilian pepper (*Schinus terebinthifolius*) populations in the littoral zone, including spoil bank areas in Lake Okeechobee.** The treatment of most mature trees was completed in 2002. Monitoring for signs of regrowth will continue throughout the marsh, with additional treatments as needed. In 2003–2004, approximately 500 acres of Brazilian pepper trees were treated.
4. **Establish desirable native plant communities in areas now dominated by exotic plants.** Large-scale natural recruitment of native plants has been observed in many treatment areas previously dominated by torpedograss. Plant management activities designed to reduce the areal coverage and density of exotic vegetation and promote the reestablishment of native plants will continue. Management efforts will interface with other local and state programs.

Exotic vegetation will be treated according to species-specific management plans. Monitoring continues throughout the year to evaluate treatment efficacy of all species. Vegetation maps are produced using Geographic Information Systems (GIS) to evaluate treatment efficacy, the rate of recovery of native vegetation in areas where torpedograss has been treated, and the rate of torpedograss expansion in untreated areas.

IN-LAKE RESTORATION ACTIVITIES

The restoration of valuable habitat within Lake Okeechobee for fish and wildlife, and for establishment of native plant/animal communities, can help to increase the lake's ability to assimilate phosphorus. Previous efforts during the drought of 2000 and 2001 concentrated on the removal of organic material that accumulated along the northwest lakeshore in the late 1990s, due to high water levels. Recent efforts are focusing on the restoration of Torry and Kreamer islands at the south end of the lake through the removal of earthen berms to facilitate water flow between the lake and the interior of the islands, as well as native vegetation replanting on Torry Island. The earthen berms along the perimeter of Ritta Island have been removed. Replanting efforts for pond apple (*Annona glabra*) and cypress (*Taxodium* spp.) will be initiated on some restored areas by the Florida Fish and Wildlife Conservation Commission (FWC). The removal of a remnant berm along the southeast shore of Kreamer Island is being evaluated.

PHASE I LAKE OKEECHOBEE CONSTRUCTION PROJECT

Phase I of the Lake Okeechobee Construction Project is intended to cause immediate phosphorus load reductions to Lake Okeechobee, consistent with the recommendations of the South Florida Ecosystem Restoration Working Group's Lake Okeechobee Action Plan. The status and performance of the projects that comprise Phase I are described below.

Lake Okeechobee Water Retention/Phosphorus Removal Critical Project

Stormwater Treatment Areas

Plans and specifications were completed for the Taylor Creek (Grassy Island Ranch) Stormwater Treatment Area (STA) in December 2002, and for the Nubbin Slough (New Palm/Newcomer Dairy) STA in June 2003. Construction contracts have been awarded for both STAs and a combined ground-breaking ceremony was held on June 30, 2004. Construction is scheduled for completion in July 2005 and October 2005 for the Taylor Creek and Nubbin Slough STAs, respectively.

The reduction of phosphorus loads to Lake Okeechobee is expected to be 0.85 metric tons of phosphorus per year for the Taylor Creek STA and 2.02 metric tons of phosphorus per year for the Nubbin Slough STA. These estimates are based on simulations using the steady-state STA model, using lower inflow concentrations after BMPs are implemented, and accounting for assimilation in tributaries.

Isolated Wetlands

The Byrd Isolated Wetland Critical Project was completed in June 2002.

Lake Okeechobee Tributary Sediment Removal Pilot Project

The Tributary Sediment Removal Pilot Project was completed in June 2004. This project was conducted in Lettuce Creek, a tributary on the northeast side of Lake Okeechobee, to evaluate the phosphorus reduction benefits which can be realized by removal of tributary sediment loads using a Continuous Deflective Separation (CDS) unit and a traditional baffle box or Tributary Sediment Trap (TST). No significant removal of particulate phosphorus was observed in the CDS and TST units at 1, 5, or 11 cubic feet per second (cfs). The inability of the units to remove particulate

phosphorus from Lettuce Creek inflow was attributed to high dissolved phosphorus fraction and the small diameter particles discharging into Lettuce Creek, which are too small to be removed effectively by both units. The 20-year life cycle costs for total phosphorus removal were \$1,664 per lb and \$2,046 per lb for the CDS and TST units, respectively. Chemical treatment of the inflow to the CDS and TST units substantially enhanced removal of total phosphorus, with removals ranging from 2 percent to 79 percent. The 20-year life cycle cost for mass removal of total phosphorus ranged from \$270 per lb to \$273 per lb for the two units, which are substantially lower than the estimated mass removal costs for the unmodified units. However, chemical coagulation would be much more cost effective and efficient if a simple settling pond were to be used for collection of generated floc rather than relying on the CDS or TST unit. Therefore, it was concluded that the use of CDS and TST for removal of particulate phosphorus in tributaries discharging to Lake Okeechobee does not appear to be a feasible nutrient reduction alternative. The use of these technologies appears to be more suited to an urban environment, where particle sizes would likely be larger.

Taylor Creek/Nubbin Slough Reservoir Assisted Stormwater Treatment Area (RASTA)

The Taylor Creek/Nubbin Slough Reservoir Assisted Stormwater Treatment Area (RASTA) is one of four components of the LOWP. The LOWP is currently in the plan-formulation stage. After a thorough evaluation of water quality treatment technologies, a RASTA is the primary type of management measure under consideration to address the storage and load reduction objectives of the project. Alternative RASTA configurations are being screened. Management measures have been identified and preliminary alternatives are being developed. It is anticipated that the tentatively selected plan will be completed by January 2005.

The LOWP, including the Taylor Creek/Nubbin Slough RASTA, will be a major component of Phase II of the Lake Okeechobee Construction Project. The goal of the LOWP for reducing phosphorus loads to Lake Okeechobee will be consistent with the LOPP. The LOPP will provide the target for the reduction of phosphorus load to be achieved by the LOWP.

MONITORING OF LAKE WATER QUALITY AND ECOLOGICAL CONDITIONS

For information on the monitoring of water quality and ecological conditions in Lake Okeechobee, see the Lake Status, Management, and Research section in Chapter 10 of the *2005 South Florida Environmental Report – Volume I*.

MONITORING OF WATERSHED WATER QUALITY

For information on the monitoring of water quality in the Lake Okeechobee Watershed, see the Watershed Status, Management, and Research section in Chapter 10 of the *2005 South Florida Environmental Report – Volume I*.

CHALLENGES/UNRESOLVED ISSUES/MAJOR UNCERTAINTIES

- Funds for monitoring phosphorus reductions by non-agricultural BMPs
- Amending the Works of the District rule (Chapter 40E-61, F.A.C.) to better interface with LOPP projects, including the FDACS BMP rule (5M-3) and adopting non-agricultural BMPs into the WOD program

ENCUMBRANCES/EXPENDITURES FOR FISCAL YEARS 2001 THROUGH 2005

Table 3-2 indicates the distribution of funding, encumbrances and expenditures for the state-appropriated funds from Fiscal Years 2001 through 2005 (FY2001–FY2005).

Table 3-2. Fiscal Years 2001 through 2005 (FY2001–FY2005) state funding appropriations, encumbrances and expenditures for the Lake Okeechobee Protection Program.

FDACS – FY2001 One-time appropriation, 1591-G, 2000-01 GAA \$15,000,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Operations					
Salaries, Overhead and Travel	-	\$ 1,407,619	\$ 1,417,709	-	\$450,000 needed annually to support administration of the Lake Okeechobee Protection Program
Operating Capital Outlay	-	-	\$ 125,110	-	
Motor Vehicles	-	-	\$ 59,904	-	
Administrative Overhead Transfer	-	-	\$ 119,716	-	
Certified Forward Encumbered Funds	-	-	\$ 336,581	-	
Contracts					
NRCS contract	-	-	\$ 189,107	-	
Dairy Nutrient Management Assessments & Implementation	-	\$ 29,789	\$ 1,855,563	-	Engineering design and cost-share to implement dairy nutrient management plans
Nutrient management planning for cow/calf operations	-	\$ 1,907,821	\$ 1,341,593	-	Nutrient management planning and cost-share for cow/calf operations
UF-IFAS education, research, and demonstration project	-	\$ 829,765	\$ 615,775	-	Research and demonstration for BMP development
Phosphorus Removal	-	\$ 337,528	\$ 591,622	-	Hydromentia/ P-sensor project
TOTAL FOR FDACS – FY2001	\$ 15,000,000	\$ 4,512,522	\$ 6,652,680	\$ 3,834,798	

SFWMD – FY2001 Appropriation \$23,500,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Phosphorus Source Control Grant (PSCG) Program					
3-Year Leased Position – Project Manager	\$ 205,505	-	\$ 172,075	\$ 33,430	Planned to be expended by May 2005
Training	\$ 2,000	-	\$ 947	\$ 1,053	Training for new leased employees
Berryman & Henigar - Engineering Oversight Contract	\$ 300,000	\$ 91,330	\$ 208,670	-	
LO Torpedograss Management	\$ 500,000	-	\$ 499,519	\$ 481	
Davie Dairy, Inc.	\$ 95,270	\$ 700	\$ 94,570	-	
Smith Okeechobee Farms, Inc.	\$ 409,560	\$ 17,852	\$ 391,708	-	
Evans Properties, Inc.	\$ 157,000	-	\$ 157,000	-	
Okeechobee Utility Authority, Ousley	\$ 506,000	-	\$ 506,000	-	
Tampa Farm Service	\$ 1,300,810	\$ 62,433	\$ 1,238,377	-	
Irene Lofton	\$ 92,000	\$ 12,640	\$ 79,360	-	
Aquaflorida, Inc.	\$ 516,600	-	\$ 516,000	\$ 600	
SWA of PBC	\$ 1,125,000	\$ 473,234	\$ 651,766	-	
Daniel & Marcia Candler	\$ 120,000	\$ 30,000	\$ 90,000	-	
Hydromentia, Inc.	\$ 1,815,215	\$ 74,297	\$ 1,740,918	-	
QED Environmental	\$ 291,655	-	\$ 291,655	-	
Milking R. Dairy	\$ 63,385	\$ 21,786	\$ 41,314	\$ 285	
PSCG TOTAL	\$ 7,500,000	\$ 784,271	\$ 6,679,880	\$ 35,849	
Grassy Island					
Taylor Creek STA Land & Land Improvement	\$ 8,000,000	-	\$ 8,000,000	-	
Taylor Creek STA Land Acquisition Cost	\$ 500,000	-	\$ 500,000	-	
GRASSY ISLAND TOTAL	\$ 8,500,000	-	\$ 8,500,000	-	
Restoration of Isolated Wetlands					
Easement Distributions to landowners	\$ 2,050,849	-	\$ 609,357	\$ 1,441,492	
3-Year Leased Employees – Staff Environmental Scientist, Senior Geographer Associate	\$ 286,276	-	\$ 196,842	\$ 89,434	Planned to be expended by August 2005

SFWMD – FY2001 Appropriation \$23,500,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Appraisal Services	\$ 17,875	-	\$ 17,875	-	
Restoration Implementation Contract/Birkett Environmental	\$ 875,000	\$ 364,616	\$ 510,384	-	
Restoration Implementation Contract/C&N Environmental	\$ 750,000	\$ 615,555	\$ 134,445	-	
Construction Contract	\$ 370,000	-	\$ -	\$ 370,000	
Water Quality Monitoring Contract	\$ 150,000	\$ 118,238	\$ 31,762	-	
ISOLATED WETLANDS TOTAL	\$ 4,500,000	\$ 1,098,408	\$ 1,500,666	\$ 1,900,926	
Structure Retrofit and Dredging					
L-62 Dredging/S-192 Gate & Pump Replacement	\$ 1,033,007	\$ 61,860	\$ 971,147	-	
PC-01-L59 Culvert Replacement	\$ 112,000	-	\$ 112,000	-	
L-63N Dredging	\$ 481,775	\$ 19,364	\$ 427,276	\$ 35,135	
Taylor Creek Dredging Project	\$ 600,000	\$ 600,000	-	-	
Urban Stormwater Retrofit – Lemkin Creek	\$ 618,105	-	-	\$ 618,105	
G-106 Structure Retrofit	\$ 105,113	\$ 94,000	\$ 3,351	\$ 7,762	
PL-566 Structure Replacements	\$ 50,000	\$ 24,990	\$ 24,995	\$ 15	
STR. RETROFIT/DREDGE TOTAL	\$ 3,000,000	\$ 800,214	\$ 1,538,769	\$ 661,017	
TOTAL FOR SFWMD – FY2001	\$ 23,500,000	\$ 2,682,894	\$ 18,219,314	\$ 2,597,792	
GRAND TOTAL FOR LAKE OKEECHOBEE FY2001 APPROPRIATION	\$ 38,500,000	\$ 7,195,416	\$ 24,871,994	\$ 6,432,590	

SFWMD – FY2002 Appropriation \$10,000,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
In-lake restoration projects (berm removal, Torry Island, native plant revegetation, etc.)	\$ 1,800,000	\$ 1,131,112	\$ 662,059	\$ 6,829	
Torry Island Pond Apple Replanting	\$ 150,000	\$ 47,570	\$ 102,430	-	
Public/Private Partnerships	\$ 2,750,000	\$ 2,750,000	-	-	
DEP Non-Ag Collaboration	\$ 575,000	-	\$ 575,000	-	
Cow/Calf BMPs	\$ 450,000	-	\$ 450,000	-	
Isolated Wetland Research	\$ 700,000	-	\$ 700,000	-	
Industrial Canal Sediment Removal	\$ 500,000	-	\$ 500,000	-	
Pahokee Harbor Sediment Removal	\$ 250,000	-	\$ 250,000	-	
Belle Glade Marina Sediment Removal	\$ 250,000	\$ 5,233	\$ 244,767	-	
Glades County/Moore Haven – Stormwater/Wastewater Plan Update	\$ 250,000	-	\$ 250,000	-	
Okeechobee County – Stormwater/Wastewater Plan Update	\$ 175,000	-	\$ 175,000	-	
Watershed Assessments	\$ 232,431	-	\$ 232,431	-	
Vegetation Replanting	\$ 15,400	-	-	\$ 15,400	
Torpedograss Control Studies	\$ 110,000	-	\$ 110,000	-	
Model Uncertainty Refinement	\$ 391,910	\$ 159,454	\$ 232,456	-	Balance of \$6,840 to Reserve Project
LO Pilot Dredging Confined Disposal Facilities	\$ 48,340	-	\$ 48,340	-	Balance of \$160 to Reserve Project
LO Planning Contract/LO Blue Book Reporting	\$ 99,943	-	\$ 99,943	-	Balance of \$57 to Reserve Project

SFWMD – FY2002 Appropriation \$10,000,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Expert Assistance	\$ 50,684	-	\$ 50,684	-	Balance of \$100 to Reserve Project
Regulatory Assessments	\$ 330,000	-	\$ 330,000	-	
Equipment/Supplies	\$ 65 ,452	-	\$ 25 ,844	\$ 39,608	
3-Year Leased Employees – Staff Engineer, Project Manager, Sr. Env. Scientist	\$ 540,000	-	\$ 376,188	\$ 163,812	
Assessment of Water Control Practices in the Four Priority Basins of the LO Watershed	\$ 115,455	-	\$ 115,455	-	Balance of \$43,614 to Reserve Project
Torry Island Nature Center – Design	\$ 20,000	-	\$ 20,000	-	
Property Appraisal	\$ 20,250	-	\$ 20,250	-	
Torpedograss Biocontrol	\$ 8,788	-	\$ 8,788	-	
Lake Okeechobee Structure Survey	\$ 39,590	-	\$ 39,590	-	Balance of \$4,626 to Reserve Project
Landuse Change Analysis	\$ 6,360	-	\$ 6,360	-	
Optimization of BMPs for Beef Cattle Ranching	\$ 55,397	-	-	\$ 55,397	Reserve Project (see FY2003 for funds to total \$100K)
GRAND TOTAL FOR LAKE OKEECHOBEE FY2002 APPROPRIATION	\$ 10,000,000	\$ 4,093,368	\$ 5,625,587	\$ 281,045	

SFWMD – FY2003 Appropriation \$7,500,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Alternative Phosphorus Reduction Technologies Feasibility Study	\$ 70,136	\$ 1,165	\$ 68,971	-	Balance of \$29,864 to Reserve Project
Pilot STA Performance Optimization	\$ 200,000	-	\$ 9,540	\$ 190,460	
LOADSS Model Upgrade	\$ 50,000	-	\$ 50,000	-	Transferred to FDACS
Lake Okeechobee Protection Plan Development	\$ 103,380	-	\$ 103,380	-	Balance of \$6,514 to Reserve Project
S-310 Seawall stabilization/Industrial Canal	\$ 315,000	-	\$ 315,000	-	
NRCS Spectral Nutrient Evaluation	\$ 100,000	-	\$ 100,000	-	
Optimization of Torpedograss Herbicide Treatment	\$ 69,719	\$ 69,719	-	-	Balance of \$281 to Reserve Project
Public/Private Partnerships	\$ 2,000,000	\$ 2,000,000	-	-	
Best Available Technologies for Dairies	\$ 427,750	\$ 92,609	\$ 335,141	-	
Buck Island Ranch Study	\$ 126,237	-	\$ 126,237	\$ -	Balance of \$2,763 to Reserve Project
Mosquito Creek Gates	\$ 200,000	-	-	\$ 200,000	
Former Dairy Restoration (5 former dairies)	\$ 2,000,000	\$ 1,958,718	\$ 41,282	\$ -	
Water Quality/Alternative Water Supply	\$ 300,000	-	-	\$ 300,000	
Tailwater Recovery System	\$ 150,000	-	-	\$ 150,000	
On-Ranch Environmental Services Strategies	\$ 50,000	-	\$ 50,000	\$ -	Transferred to FDACS
Nubbin Slough STA Flow Diversion					
Assessment	\$ 66,009	\$ 36,009	\$ 30,000	\$ -	
Construction	\$ 370,889	-	-	\$ 370,889	
Lamb Island Tributary Stormwater Treatment Project	\$ 500,000	\$ 500,000	-	\$ -	
LOPP BMP Performance Analysis	\$ 12,900	-	\$ 12,900	\$ -	

SFWMD – FY2003 Appropriation \$7,500,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Lake Restoration Activities	\$ 73,558	-	\$ 73,558	\$ -	
Submerged Plant Study	\$ 5,965	-	\$ 5,965	\$ -	
S-65E Study/Water Quality	\$ 122,203	\$ 7,000	\$ 115,203	\$ -	
Equipment/Supplies	\$ 10,892	-	-	\$ 10,892	
STA Assessment	\$ 25,000	\$ 19,440	-	\$ 5,560	Reserve Project
PL-566 Structure Replacements	\$ 105,758	-	-	\$ 105,758	Reserve Project
Optimization of BMPs for Beef Cattle Ranching	\$ 44,603	-	-	\$ 44,603	Reserve Project (see FY2002 for funds to total \$100K)
GRAND TOTAL FOR LAKE OKEECHOBEE FY2003 APPROPRIATION	\$ 7,500,000	\$ 4,684,660	\$ 1,437,177	\$ 1,378,163	

FDACS – FY2005 Appropriation \$5,000,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
EQIP Match	\$ 398,000	-	-	\$ 398,000	
Eagle Island Tailwater Recovery Project	\$ 250,000	-	-	\$ 250,000	
PL-566 Structure Replacements	\$ 450,000	-	-	\$ 450,000	
Seminole Project	\$ 250,000	-	-	\$ 250,000	
Dairy Stormwater Management	\$ 3,502,000	-	-	\$ 3,502,000	
Buck Island	\$ 150,000	-	-	\$ 150,000	
TOTAL FOR FDACS – FY2005	\$ 5,000,000	-	-	\$ 5,000,000	

FDEP – FY2005 Appropriation \$700,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Pahokee WWTP Improvements	\$ 700,000	-	-	\$ 700,000	
TOTAL FOR FDEP – FY2005	\$ 700,000	-	-	\$ 700,000	
SFWMD – FY2005 Appropriation \$4,300,000	Appropriation	Contract Agreement Executed/ Encumbered	Expended	Balance	Comments
Nubbin Slough STA Expansion Project	\$ 4,300,000	-	-	\$ 4,300,000	
TOTAL FOR SFWMD – FY2005	\$ 4,300,000	-	-	\$ 4,300,000	
GRAND TOTAL FOR LAKE OKEECHOBEE FY2005 APPROPRIATION	\$ 10,000,000	-	-	\$ 10,000,000	

LITERATURE CITED

URS Group. 2002. Value Engineering Study, Herbert Hoover Dike Rehabilitation and Repair, Reach 1. United States Army Corps of Engineers, Jacksonville, FL.